WHAT IS CLAIMED IS:

34. A method comprising the steps of:

(a) covalently attaching species to the exterior of the fullerene carbon nanocage to form a derivatized fullerene carbon nanocage, wherein the derivatized fullerene carbon nanocage is a fluorinated fullerene nanocage;

(b) inserting an endohedral doping agent into the derivatized fullerene carbon nanocage.

35. The method of Claim 34, wherein the step of covalently attaching decreases the potential energy barrier for the step of inserting.

36. The method of Claim 34, wherein the fullerene carbon nanocage is selected from the group consisting of fullerenes, buckyballs, carbon nanotubes, nested fullerenes, bucky onions, single-wall carbon nanotubes, multi-wall carbon nanotubes, carbon fibrils, and combinations thereof.

37. The method of Claim 34, wherein the endohedral doping agent is selected from the group consisting of a charged species, a neutral species, ion(s), atom(s), atom clusters, molecules, and combinations thereof.

38. The method of Claim 37, wherein the endohedral doping agent is radioactive.

39. The method of Claim 37, wherein the endohedral doping agent is inserted via ion bombardment.

40. The method of Claim 37, wherein the endohedral doping agent decays into a radioactive species.

41. The method of Claim 34, further comprising removing at least some of the covalently attached species from the exterior of the fullerene carbon nanocage after the step of inserting.

42. The method of Claim 34, further comprising adding bio-specific ligands or antibodies to the fullerene nanocage.

43. The method of Claim 42, wherein the step of adding occurs before the step of attaching.

44. The method of Claim 42, wherein the step of adding occurs during the step of attaching.

45. The method of Claim 42, wherein the step of adding occurs between the step of attaching and the step of inserting.

46. The method of Claim 42, wherein the step of adding occurs after the step of inserting.

47. The method of Claim 34, wherein the step of inserting comprises breaking and subsequent reformation of carbon-carbon bonds in the fullerene nanocage structure.

48. A method comprising:

(a) derivatizing a fullerene with a fluorine specie; and

(b) endohedrally modifying the fullerene.

49. The method of Claim 48, wherein the fullerene is a fullerene tube.

50 The method of Claim 49, wherein the fullerene tube is a single-wall carbon nanotube.

51. The method of Claim 50, wherein the sidewall carbon nanotube is derivatized on the sidewall of the single-wall carbon nanotube.

52. A composition comprising:

(a) a fluorine-derivatized fullerene;

(b) a first species covalently attached to the fullerene; and

(c) a second species endohedrally located in the fullerene.

53. The composition of Claim 52, wherein the second species is selected from the group consisting of ions, atoms, molecules, and combinations thereof.

54. The composition of Claim 52, wherein the second species is radioactive.

55. The composition of Claim 52 further comprising a third species attached to the fullerene, wherein the third species is selected from the group consisting of bio-specific ligands, antibodies, and combinations thereof.

56. The composition of Claim 52, wherein, the first species is selected from the group consisting of bio-specific ligands and antibodies.

57. A composition comprising:

(a) fullerene carbon nanocage;

(b) a first species covalently attached to the fullerene carbon nanocage, wherein the first species covalently attached to the fullerene carbon nanocage is fluorine; and

(c) a second species endohedrally located in the fullerene carbon nanocage.

58. The composition of Claim 57 further comprising a third species attached to the fullerene, wherein the third species attached to the fullerene carbon nanocage is selected from the group consisting of bio-specific ligands, antibodies, and combinations thereof.

59. The composition of Claim 57, wherein the second species endohedrally located in the fullerene carbon nanocage is a radioactive species.

60. The composition of Claim 59, wherein the radioactive species is selected from the group consisting of T^+, T_2, ^3He, cobalt isotopes of small ionic radius, and combinations thereof.

61. The composition of Claim 57, wherein the fullerene carbon nanocage is a fullerene tube.

62. The composition of Claim 61, wherein the fullerene tube is a single-wall carbon nanotube.

63 The composition of Claim 62, wherein the sidewall carbon nanotube is derivatized on the sidewall of the single-wall carbon nanotube.

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Conclusion

Applicant respectfully submits that the claim listing corresponds to the claims as allowed. The last claim as been corrected to be not self-dependent. It corresponds to claim 33, which was not self-dependent as originally filed. A period missing at the end of claim 3 in the response, present in the originally filed claim has been added in now claim 35 corresponding to claim 3. Claims 61-63 correctly refer to the "composition", as opposed to "method", as in originally filed claims 31-33.

If the Examiner has any questions or comments concerning this paper or the present application in general, the Examiner is invited to call the undersigned at 713-650-2780.

Respectfully submitted,

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